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NATIONAL COMMUNICATIONS SYSTEM

VOLUME III
TEST DATA
ELECTROMAGNETIC PULSE TESTING
OF PROTECTION DEVICES

SECTION 6

EQUIPMENT AND DEVICES

BENCH CHECK MEASUREMENTS

OCTOBER 1985

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Electromagnetic Pulse Transient Threat Testing of Protection Devices for Amateur/Military Affiliate Radio System Equipment (U) Section 6, Equipment & Devices Bench Check Measurements

12 PERSONAL AUTHOR(S) Dennis Bodson, NCS; Joseph Frizzell and Thomas Higdon (ESI); Walter Rabke (Consultant)

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19 ABSTRACT (Continue on reverse if necessary and identify by block number)

This technical report discusses the vulnerability of equipment used by amateur/MARS radio operators in the United States to disruption or damage by transient electromagnetic effects such as lightning, voltage surges, and electromagnetic pulse (EMP) waves. It also reports the results of two test programs; one to evaluate existing transient suppression devices and components, and one to evaluate the response of amateur radio equipment to an EMP transient environment.

Based on the test results, the report recommends procedures and a low-cost installation scheme which will significantly increase the operational survivability of amateur type communications equipment in a lightning or EMP environment.

This report consists of three volumes. Volume I (200 pages) contains the test results and recommendations for transient protection of amateur radio equipment. Volume II

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SECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

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Block 19 Continued - ABSTRACT
(136 pages) contains supporting documentation including: the test plans for the two
EMP tests, descriptions/specifications of the tested transient suppression devices
and the amateur radio equipment, and photographs of the test facilities and test
set-ups. Volume III (1298 pages) contains the raw test data in the form of
oscilloscope photographs attached to the test data sheets for both test programs,
as well as, written test descriptions and bench check measurements from the
equipment test program. For most purposes Volume I should provide sufficient
information. Volume II would be required to obtain more detailed descriptions of
the test programs and tested devices and equipment. Volume III would only be
required if a separate analysis of the test data is being made.

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ELECTROMAGNETIC PULSE/TRANSIENT THREAT TESTING OF PROTECTION DEVICES FOR AMATEUR/MILITARY AFFILIATE RADIO SYSTEM EQUIPMENT

OCTOBER 1985

PROJECT OFFICER

DENNIS BODSON
Senior Electronics Engineer
Office of Technology
and Standards

APPROVED FOR PUBLICATION:

for MARSHALL L. CAIN
Assistant Manager
Office of Technology
and Standards

FOREWORD

The National Communications System (NCS) is an organization of the Federal government whose membership is comprised of 22 Government entities. Its mission is to assist the President, National Security Council, Office of Science and Technology Policy, and Office of Management and Budget in:

o   The exercise of their wartime and non-wartime emergency functions, and their planning and oversight responsibilities.

o   The coordination of the planning for and provision of National Security/Emergency Preparedness communications for the Federal government under all circumstances including crisis or emergency.

In support of this mission the NCS has executed a Memorandum of Understanding with the American Radio Relay League. Its purpose is to establish a broad framework for a cooperative and close working relationship with volunteer radio amateurs for support of national emergency communications functions. It is intended through joint coordination and exercise of the resources of both organizations, to enhance the nation-wide posture of telecommunications readiness for any conceivable national emergency. This particular Technical Information Bulletin is one of a series aimed at developing an awareness in the radio amateur community of practical, low cost EMP protective procedures, devices, and equipment which may if utilized significantly enhance the probability of amateur radio resources escaping serious damage during emergency situations involving EMP events.

Comments, on this TIB are welcome, and should be addressed to:

Office of the Manager
National Communications System
ATTN: NCS-TS
Washington, DC 20305-2010
(202) 692-2124

TEST	SYSTEM NUMBER	DATE
PRE TEST	1	7-24-85

TRANSMITTER YAESU FT-757GX/FP-757-HD/FC-757 AT

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8	102				✓
3.8	100				✓
7.3	104				✓
10.3	107				✓
14.3	106				✓
18.3	106				✓
21.3	104				✓
24.8	101				✓
28.3	94				✓

TEST	SYSTEM NUMBER	DATE
A	1	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8	104				✓
3.8	102				✓
7.3	106				✓
10.3	109				✓
14.3	107				✓
18.3	110				✓
21.3	106				✓
24.8	98				✓
28.3	88				✓

TEST	SYSTEM NUMBER	DATE
B1	1	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8	101				✓
3.8	100				✓
7.3	102				✓
10.3	103				✓
14.3	102				✓
18.3	99				✓
21.3	92				✓
24.8	82				✓
28.3	75				✓

TEST	SYSTEM NUMBER	DATE
B2	1	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8	103	103			✓
3.8	101	100			✓
7.3	104	105			✓
10.3	105	110			✓
14.3	104	110			✓
18.3	101	112			✓
21.3	93	112			✓
24.8	83	115			✓
28.3	75	112			✓
	ANTENNA OUTPUT ON ANTENNA TUNER	ANTENNA OUTPUT ON TRANSCEIVER			

TEST	SYSTEM NUMBER	DATE
D2	1	8-2-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8	94		95		✓
3.8	95		95		✓
7.3	92		89		✓
10.3	95		94		✓
14.3	84		80		✓
18.3	83		82		✓
21.3	73		74		✓
24.8	80		72		✓
28.3	75		68		✓
TUNER WORKS	OK				

TEST	SYSTEM NUMBER	DATE
F8+9	⊥	8-8-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8	* 96		100	106	✓
3.8	* 90		98	102	✓
7.3	94		92	102	✓
10.3	* 89		88	99	✓
14.3	68		*92	98	✓
18.3	* 65		*97	101	✓
21.3	67		*99	105	✓
24.8	70		*94	108	✓
28.3	68		*94	96	✓

· AUTOMATIC PART OF ANTENNA TUNER IS NO GOOD.

A. TUNER TUNES MANUALLY - OK

* MANUAL TUNING TO MAX. PWR. OUT.

TEST	SYSTEM NUMBER	DATE
PRE TEST	1	7-24-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-105	
3.8		-107.5	
7.3		-105	
10.3		-102.4	
14.3		-102.8	
18.3		-100.8	
21.3		-100.2	
24.8		-103	
28.3		-102.3	

TEST	SYSTEM NUMBER	DATE
A	1	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-107.9	
3.8		-107.9	
7.3		-107	
10.3		-102.9	
14.3		-102.9	
18.3		-101.4	
21.3		-101	
24.8		-104	
28.3		-104	

TEST	SYSTEM NUMBER	DATE
B1	1	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-106.9	
3.8		-107	
7.3		-106.9	
10.3		-103.3	
14.3		-102.9	
18.3		-102.3	
21.3		-102	
24.8		-104.6	
28.3		-104.2	

TEST	SYSTEM NUMBER	DATE
B2	1	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-106.5	
3.8		-107.0	
7.3		-107.0	
10.3		-102.9	
14.3		-102.9	
18.3		-102.0	
21.3		-101.8	
24.8		-104.1	
28.3		-104.1	

TEST	SYSTEM NUMBER	DATE
D2	⊥	8.5.85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8	103.8	103.5	
3.8	104.8		
7.3	104.3	104.2	
10.3	100		
14.3	100		
18.3	100	99.5	
21.3	99.1		
24.8	101.4		
28.3	101.9	101.9	
	THRU TUNER	THRU TUNER	

	TEST	SYSTEM NUMBER	DATE
	F8/9	L	8.8.85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8	102.5		
3.8	103		
7.3	101 *		
10.3	98		
14.3	98.5		
18.3	98.7		
21.3	99		
24.8	100		
28.3	97.3		
	WITH TUNER * TUNER LOSS -2dB THIS FREQ ONLY		

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	*2*	*7-24-85*

TRANSMITTER *YAESU FT-757 GX / FP 757 HD*

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		*107*			✓
3.8		*104*			✓
7.3		*110*			✓
10.3		*112*			✓
14.3		*115*			✓
18.3		*119*			✓
21.3		*119*			✓
24.8		*120*			✓
28.3		*116*			✓

	TEST	SYSTEM NUMBER	DATE
	A	2	7-30-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		107			✓
3.8		105			✓
7.3		111			✓
10.3		115			✓
14.3		118			✓
18.3		118			✓
21.3		119			✓
24.8		121			✓
28.3		121			✓

/

TEST	SYSTEM NUMBER	DATE
B2	2	7-30-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		107			✓
3.8		105			✓
7.3		112			✓
10.3		116			✓
14.3		119			✓
18.3		120			✓
21.3		120			✓
24.8		123			✓
28.3		122			✓

	TEST	SYSTEM NUMBER	DATE
	C⊥	2	7-31-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		107			✓
3.8		105			✓
7.3		110			✓
10.3		112			✓
14.3		112			✓
18.3		115			✓
21.3		115			✓
24.8		115			✓
28.3		109			✓

/

	TEST	SYSTEM NUMBER	DATE
	C2	*2*	*7-31-85*

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		*106*			✓
3.8		*105*			✓
7.3		*110*			✓
10.3		*112*			✓
14.3		*113*			✓
18.3		*115*			✓
21.3		*115*			✓
24.8		*114*			✓
28.3		*108*			✓

POWER-ON TEST WITH HONDA GENERATOR

TEST	SYSTEM NUMBER	DATE
C3	2	7-31-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		106			✓
3.8		105			✓
7.3		110			✓
10.3		111			✓
14.3		112			✓
18.3		115			✓
21.3		115			✓
24.8		115			✓
28.3		110			✓

	TEST	SYSTEM NUMBER	DATE
	C4	2	8-1-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		107			✓
3.8		105			✓
7.3		110			✓
10.3		113			✓
14.3		112			✓
18.3		115			✓
21.3		106			✓
24.8		115			✓
28.3		110			✓

TEST	SYSTEM NUMBER	DATE
DL	2	8-2-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		107		106	✓
3.8		104		104	✓
7.3		110		109	✓
10.3		112		112	✓
14.3		112		112	✓
18.3		115		113	✓
21.3		115		112	✓
24.8		113		110	✓
28.3		106		103	✓

TEST	SYSTEM NUMBER	DATE
D15 R+T	2	8-7-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		130		130	✓
3.8		117		119	✓
7.3		121		122	✓
10.3		125		125	✓
14.3		128		126	✓
18.3		135		134	✓
21.3		139		135	✓
24.8		140		135	✓
28.3		134		125	✓

AFTER TEST RECEIVER NOISE STAYED
AT S-5 LEVEL -

TEST	SYSTEM NUMBER	DATE
E 1, 2+3	2	8-7-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		107			✓
3.8		105			✓
7.3		110			✓
10.3		112			✓
14.3		115			✓
18.3		119			✓
21.3		120			✓
24.8		121			✓
28.3		125			✓

	TEST	SYSTEM NUMBER	DATE
	F1+2	2	8-7-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		185			✓
3.8		225			✓
7.3		210			✓
10.3		210			✓
14.3		210			✓
18.3		195			✓
21.3		185			✓
24.8		165			✓
28.3		160			✓

TX RATED AT 100 WATTS -   NO ANTENNA PROTECTION DURING PULSE TEST.

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	*2*	*7-24-85*

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		*- 109.2*	
3.8		*- 111*	
7.3		*- 109.2*	
10.3		*- 103.4*	
14.3		*- 106.8*	
18.3		*- 105.7*	
21.3		*- 104.1*	
24.8		*- 108*	
28.3		*- 107.5*	

	TEST	SYSTEM NUMBER	DATE
	A	2	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-109	
3.8		-110	
7.3		-109.6	
10.3		-103.5	
14.3		-105.8	
18.3		-104.2	
21.3		-103.9	
24.8		-107.4	
28.3		-105.4	

TEST	SYSTEM NUMBER	DATE
B2	2	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-105.8	
3.8		-106.6	
7.3		-106.2	
10.3		-102	
14.3		-102.8	
18.3		-101	
21.3		-97.5	
24.8		-102	
28.3		-100	

7-30-85

	TEST	SYSTEM NUMBER	DATE
	C⊥	2	7-31-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-105.9	
3.8		-105.9	
7.3		-105.3	
10.3		-101.9	
14.3		-102.8	
18.3		-101	
21.3		-96.2	
24.8		-100	
28.3		-100	

	TEST	SYSTEM NUMBER	DATE
	C2	2	7-31-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM) Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-105	
3.8		-106	
7.3		-105.4	
10.3		-100.5	
14.3		-102.8	
18.3		-101	
21.3		-98	
24.8		-101.5	
28.3		-100	
		POWER-ON HONDA GEN. HONDA OUTSIDE PULSER.	

	TEST	SYSTEM NUMBER	DATE
	C-3	2	7-31-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-106	
3.8		-106	
7.3		-105	
10.3		-101.5	
14.3		-102.9	
18.3		-101	
21.3		-97.8	
24.6		-103.9	
28.3		-101.5	

TEST	SYSTEM NUMBER	DATE
C 4	2	8-1-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		- 106	
3.8		-107.5	
7.3		-105.5	
10.3		-102.8	
14.3		-103.4	
18.3		- 101.5	
21.3		-100	
24.8		-102.5	
28.3		-101.1	

POWER-ON GROUNDED - DURING PULSE.

BOTH SAFETY + NEUTRAL POWER LINES EQUIP. GROUNDED, TUNED TO f 28.3 MHZ

TEST	SYSTEM NUMBER	DATE
DL	*2*	*8-2-85*

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8	105,1	105,9	
3.8	105,9	106,1	
7.3	104,7	105,4	
10.3	101,4	100,5	
14.3	102,3	102.7	
18.3	100,5	100,3	
21.3	97,7	94	
24.8	101,9	101,5	
28.3	101	101	

TEST	SYSTEM NUMBER	DATE
D15 R+T	*2*	*8-7-85*

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		*99*	
3.8		*101*	
7.3		*104*	
10.3		*101*	
14.3		*103*	
18.3		*103*	
21.3		*100*	
24.8		*102.5*	
28.3		*105*	

*RECEIVER NOISE LEVEL AT S-5
LEVEL AFTER PULSE -CONTINUOUS
NOISE AT S-5 -*

TEST	SYSTEM NUMBER	DATE
E1, 2+3	2	8-7-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-108.5	
3.8		-108.5	
7.3		-107.9	
10.3		-102	
14.3		-103.8	
18.3		-101.7	
21.3		-100	
24.8		-104	
28.3		-102	

AFTER PULSE WITH TRANSCEIVER
TRANSMITTING ON 10.74 MHZ.

TEST	SYSTEM NUMBER	DATE
F/+2	2	8-7-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM) Signal Generator Level for ~~S-5~~ on USB		
	WITH DEVICE	**WITHOUT DEVICE**	S-LEVEL
1.8		-65	S-9
3.8		-55	S-15
7.3		-25	S-15
10.3		-35	S-7
14.3		-44	S-20
18.3		-78	S-6
21.3		(1) -81.2	S-5
24.8		(1) -82.5	S-5
28.3		-55	S-4

RECEIVER NOISE GREATLY
INCREASED AFTER PULSE
TEST S

(1) ALSO READABLE AT S-0

FIRST READABLE
SIGNAL ABOVE
NOISE - AT S-LEVEL
SHOWN

TRANSMITTER *YAESU FT 726R*

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.5		*15*			✓
BIRD MODULE 50 C					

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.5		12			✓

TEST	SYSTEM NUMBER	DATE
B2	3	7·30-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.5		12.6			✓

TEST	SYSTEM NUMBER	DATE
D-8	3	8-5-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.5		13.0		12.9	✓

	TEST	SYSTEM NUMBER	DATE
D 19, 20, 21 + 22 / E 12, 13, 14, 15		3	8-8-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.5		15			✓
144.5	15 - NEMP 1 IN LINE			13.5	
144.5	15 - NEMP 2 IN -LINE			14.0	
144.5	510V RF TEST BOX IN LINE			1.5	
144.5	JOSLYN RF TEST BOX IN - LINE			7.0	
144.5	BARREL + COAX (ONLY) IN LINE			16.0	
144.5	FISCHER FCC 250 -150 -UHF IN LINE			18.5	

	TEST	SYSTEM NUMBER	DATE
	F 13	3	8-8-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.5		16.0		15.8	✓

TEST	SYSTEM NUMBER	DATE
PRE TEST	3	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.5		-96.0	

TEST	SYSTEM NUMBER	DATE
A	3	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.5		-92.0	
HEWETT PACKARD 608D -			

TEST	SYSTEM NUMBER	DATE
B2	3	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.5		-70	

	TEST	SYSTEM NUMBER	DATE
	D	3	8-5-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.5	-70	-68.8	

TEST   SYSTEM NUMBER 3   DATE 8-8-85

D 19, 20, 21, 22 / E 12, 13, 14, 15

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.5		-71	

TEST SYSTEM NUMBER 3 DATE 8-8-85

F13

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.5	-42.5	-38	

TEST	SYSTEM NUMBER	DATE
PRE TEST	*4*	*7-25-85*

TRANSMITTER *ICOM IC-745/PS-35/SM6/AT100/SP3*

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		*98*			✓
3.8		*98*			✓
7.3		*105*			✓
10.3		*106*			✓
14.3		*103*			✓
18.3		*98*			✓
21.3		*101*			✓
24.8		*104*			✓
28.3		*104*			✓

CW SWITCH TO VOX OR TRANSMIT SWITCH ON TX.
RF POWER SWITCH - MAX
ANTENNA TUNER OFF -

TEST	SYSTEM NUMBER	DATE
A	4	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		99			✓
3.8		100			✓
7.3		105			✓
10.3		106			✓
14.3		104			✓
18.3		100			✓
21.3		102			✓
24.8		105			✓
28.3		105			✓

TEST	SYSTEM NUMBER	DATE
BL	4	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		98			✓
3.8		94			✓
7.3		100			✓
10.3		102			✓
14.3		99			✓
18.3		96			✓
21.3		99			✓
24.8		102			✓
28.3		102			✓

TEST	SYSTEM NUMBER	DATE
B2	4	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		102			✓
3.8		95			✓
7.3		101			✓
10.3		104			✓
14.3		100			✓
18.3		97			✓
21.3		98			✓
24.8		102			✓
28.3		101			✓

TEST	SYSTEM NUMBER	DATE
D3	4	8-5-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATI
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8	100		99		✓
3.8	94		94		✓
7.3	100		99		✓
10.3	102		102		✓
14.3	100		99		✓
18.3	96		95		✓
21.3	98		97		✓
24.8	102		101		✓
28.3	101		101		✓

	TEST	SYSTEM NUMBER	DATE
	F 12	4	8·8·85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8	98		100	101	✓
3.8	93		95	101	✓
7.3	99		101	106	✓
10.3	101		102	107	✓
14.3	98		99	104	✓
18.3	95		96	100	✓
21.3	96		97	100	✓
24.8	99		101	105	✓
28.3	99		101	105	✓

ANTENNA TUNER WORKS PERFECTLY

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	4	7-25-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-87	
3.8		-87	
7.3		-92.2	
10.3		-92.8	
14.3		-91.7	
18.3		-89.2	
21.3		-89.9	
24.8		-89	
28.3		-90.6	

ANTENNA TUNER
1.8 -4
3.8 -3
7.3 ⎤ 2
10.3 ⎦
14.3 ⎤
18.3 ⎥
21.3 ⎥ ⊥
24.8 ⎥
28.3

CONNECTORS USED

PRE AMP-ON
RF GAIN -MAX

TEST	SYSTEM NUMBER	DATE
A	4	7-28-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		- 89.1	
3.8		- 89	
7.3		- 94	
10.3		- 94.2	
14.3		- 93.9	
18.3		- 88	
21.3		- 92.3	
24.8		- 85.1	
28.3		- 92.0	

	TEST	SYSTEM NUMBER	DATE
	B-1	4	7-28-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-89	
3.8		-88.9	
7.3		-93.5	
10.3		-94.2	
14.3		-93.5	
18.3		-87.5	
21.3		-92.3	
24.8		-85	
28.3		-92.3	

	TEST	SYSTEM NUMBER	DATE
	B 2	4	7-29-85

RECEIVER   ICOM

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-87	
3.8		-87	
7.3		-92.3	
10.3		-92.4	
14.3		-92.3	
18.3		-87	
21.3		-91.4	
24.8		-85.6	
28.3		-92.2	
		PRE AMP - ON RF GAIN - MAX	

	TEST	SYSTEM NUMBER	DATE
	D	4	8-5-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-86.8	
3.8		-85	
7.3		-90	
10.3		-90.2	
14.3		-90	
18.3		-85.8	
21.3		-90	
24.8		-81.9	
28.3		-89	
		THRU -ANTENNA TUNER	

TEST	SYSTEM NUMBER	DATE
F12	4	8-8-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8	-86.3		
3.8	- 84.5		
7.3	-90		
10.3	- 91		
14.3	- 90.3		
18.3	-82.6		
21.3	- 89.5		
24.8	* - 87.6		
28.3	- 88.9		
	WITH ANTENNA TUNER IN CIRCUIT * GAIN 9 dB	w/o TUNER	

TEST	SYSTEM NUMBER	DATE
PRE TEST	*5*	*7-25-85*

TRANSMITTER *ICOM IC 745 / PS 35*

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		*100*			✓
3.8		*100*			✓
7.3		*106*			✓
10.3		*108*			✓
14.3		*106*			✓
18.3		*101*			✓
21.3		*105*			✓
24.8		*108*			✓
28.3		*108*			✓

TEST	SYSTEM NUMBER	DATE
A	5	7-30-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		101			✓
3.8		103			✓
7.3		109			✓
10.3		111			✓
14.3		109			✓
18.3		105			✓
21.3		106			✓
24.8		108			✓
28.3		110			✓

TEST	SYSTEM NUMBER	DATE
B2	5	7-30-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		102			✓
3.8		103			✓
7.3		108			✓
10.3		110			✓
14.3		108			✓
18.3		103			✓
21.3		106			✓
24.8		108			✓
28.3		109			✓

TEST	SYSTEM NUMBER	DATE
D4	5	8-5-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		104		102	✓
3.8		105		103	✓
7.3		109		109	✓
10.3		111		110	✓
14.3		110		109	✓
18.3		106		105	✓
21.3		108		108	✓
24.8		111		111	✓
28.3		111		110	✓

	TEST	SYSTEM NUMBER	DATE
	F10	5	8-8-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		100		100	✔
3.8		101		100	✔
7.3		107		106	✔
10.3		110		109	✔
14.3		107		106	✔
18.3		103		102	✔
21.3		104		103	✔
24.8		109		108	✔
28.3		106		105	✔

	TEST	SYSTEM NUMBER	DATE
	F 11	5	8-8-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		102		104	✓
3.8		103		104	✓
7.3		108		110	✓
10.3		110		110	✓
14.3		108		110	✓
18.3		104		104	✓
21.3		105		104	✓
24.8		109		109	✓
28.3		106		105	✓

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	5	7-25-85

RECEIVER ICOM IC-745 / IC PS-35

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-92.8	
3.8		-92.7	
7.3		-98.4	
10.3		-98.5	
14.3		-97.7	
18.3		-95.5	
21.3		-96	
24.8		-95.2	
28.3		-96.2	

PRE TEST   7-25-85

TEST	SYSTEM NUMBER	DATE
A	5	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-91.8	
3.8		-92.5	
7.3		-98.6	
10.3		-99	
14.3		-99	
18.3		-96.7	
21.3		-97	
24.8		-95.7	
28.3		-97.9	

| | TEST | SYSTEM NUMBER | DATE |
| | *B 2* | *5* | *7-30-85* |

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		*-86.9*	
3.8		*-93*	
7.3		*-94*	
10.3		*-94*	
14.3		*-93.4*	
18.3		*-91.1*	
21.3		*-90.9*	
24.8		*-90.6*	
28.3		*-93*	

B-2 POWER CORDS EXTENDED

TEST	SYSTEM NUMBER	DATE
D4	5	8-5-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-89	
3.8		-89	
7.3		-95.7	
10.3		-96.2	
14.3		-95.8	
18.3		-93.4	
21.3		-93.1	
24.8		-92.2	
28.3		-94	

TEST	SYSTEM NUMBER	DATE
F10 T+R	5	8-8-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		87.7	
3.8		87.4	
7.3		94.0	
10.3		94.5	
14.3		92.7	
18.3		91.2	
21.3		91.2	
24.8		90	
28.3		92.8	

	TEST	SYSTEM NUMBER	DATE
	F 11	5	8-8-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8	-87.5		
3.8	-82.3		
7.3	-89.8		
10.3	-90.1		
14.3	-89		
18.3	-87.5		
21.3	-89.5		
24.8	-89.5		
28.3	-89.5		

8-8-85

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	*6*	*7-29-85*

TRANSMITTER *ICOM IC-27A*

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.0 (25W)		*19*			✓
144.0 (5W)		*4*			✓
BIRD MODULE	*50C (50W)*				

TEST	SYSTEM NUMBER	DATE
A	6	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.0 (25W)		19			✓
144.0 (5W)		3.9			✓

	TEST	SYSTEM NUMBER	DATE
	B	6	7-31-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.0 (25W)		19.5			✓
144.0 (5W)		4.0			✓

TEST	SYSTEM NUMBER	DATE
D11	6	8-5-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.0 (25W)		19.2		17.2	✓
144.0 (5W)		3.9		4.0	✓

TEST	SYSTEM NUMBER	DATE
F34+35	6	8-9-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.49 (25W)		22.5		21	✓

TEST	SYSTEM NUMBER	DATE
PRE TEST	6	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0		-93	

FM - 400 HZ MODULATION -5KHZ DEVIATION
BOONTON 202H FM SIGNAL GENERATOR

	TEST	SYSTEM NUMBER	DATE
	A	6	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.∅		-96	

	TEST	SYSTEM NUMBER	DATE
	B	6	7-31-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0		* 76	

* THIS MEASUREMENT IS NOT GOOD DATA
SEE TEST D 8-5-85

TEST	SYSTEM NUMBER	DATE
D ll	16	8-5-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0	- 94	- 95	

TEST	SYSTEM NUMBER	DATE
F34+35	6	8-9-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.49	-94		

TEST	SYSTEM NUMBER	DATE
PRE TEST	7	7-26-85

TRANSMITTER *ICOM IC - 02 AT HAND HELD*

FREQUENCY (MHZ)	POWER OUT (WATTS) (FM)				USB VOICE MODULATI
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
145.0 - HI		4.6			✓
145.0 - LO		0.7			✓
BIRD MODULE	50 c				

	TEST	SYSTEM NUMBER	DATE
	A	7	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (FM)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
145.0 - HI		4.1			✓
145.0 - LO		0.6			✓

	TEST	SYSTEM NUMBER	DATE
	D14	7	8-5-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
145.0 HI		4.0		0	✓
145.0 LO		0.8		0	✓

DEVICE FCC 450-120 WOULD NOT TRANSMIT - IT WAS REPLACED WITH A NEW FCC 450-120 WHICH DID TRANSMIT THE RF SIGNAL

	TEST	SYSTEM NUMBER	DATE
	F-18, 20, 23, 24, 30 + 31	7	8-9-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) *(FM)*				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
UNK HI		3.8			✓
UNK LO		0.5			✓

LIQUID CRYSTAL DISPLAY FAILED WHEN PULSED
HAND HELD RADIO WAS PLUGGED INTO CHARGER -
CHARGER WAS PULSED WITH AC DRIVE PULSE -
HAND HELD SURVIVED FIELD PULSE WITH ANTENNA ON.

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	7	7-26-85

RECEIVER *ICOM IC-02AT HAND HELD*

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
145.0		- 95	

BOONTON 202 H SIGNAL GENERATOR - FM -
ADJUST SIGNAL LEVEL EVEN WITH RIGHT EDGE
OF THE FIGURE FIVE ON THE HAND HELD (LCD)
DISPLAY

	TEST	SYSTEM NUMBER	DATE
	A	7	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
145.0		-96	

TEST	SYSTEM NUMBER	DATE
D14	7	8-5-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
145.0	− 94	− 94	

TEST	SYSTEM NUMBER	DATE
F 18, 20, 23, 24, 30, 31	7	8-9-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
UNK		-120	
LC DISPLAY RCVR WORKS S-METER IS AT -120 dBm ALSO, PICKS-REPEATER-	FAILED UNDER TEST - OK, BUT CAN'T DETERMINE FREQ. NOT WORKING - STRONG AUDIBLE SIGNAL UP TWO-WAY CONVERSATION		HEARD F. 71

TEST	SYSTEM NUMBER	DATE
PRE TEST	8	7-25-85

TRANSMITTER *ICOM   IC-271A*

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.0		25			✓

	TEST	SYSTEM NUMBER	DATE
	A	8	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.0		24			✓

	TEST	SYSTEM NUMBER	DATE
	B	*8*	*7-31-85*

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.0		*24*			✓

	TEST	SYSTEM NUMBER	DATE
	D9	8	8-5-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.0		26		24	✓

	TEST	SYSTEM NUMBER	DATE
F36, 37		8	8-9-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.5		25,5		27	✓

TEST	SYSTEM NUMBER	DATE
PRE TEST	8	7-25-85

RECEIVER ICOM   IC-271A

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM) Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0		106.5	

| | TEST | SYSTEM NUMBER | DATE |
| | A | 8 | 7-29-85 |

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0 (1)		71	
144.0 (2)		102	
(1) HP 608D	SIGNAL GEN.		
(2) BOONTON	202H SIG-	GEN.	

	TEST	SYSTEM NUMBER	DATE
	B	8	7-31-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0 (1)		77.0	
144.0 (2)		80.0	

(1) HP 608D
(2) BOONTON - 202 H - ONLY 30 MIN WARM-UP
                        TODAY-

	TEST	SYSTEM NUMBER	DATE
	D9	*8*	*8-8-85*

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0 (1)	*76*		
144.0 (2)	*80.5*		
(1) HP 608 D			
(2) BOONTON 202 H			

TEST	SYSTEM NUMBER	DATE
F36+37	8	8-9-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.5 (1)	69		
144.5 (2)	91.5		

(1) HP 608 D
(2) BOUNTON 202 H

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	9	7-25-85

TRANSMITTER ICOM 471 A

FREQUENCY (MHZ)	POWER OUT (WATTS) (C W)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
430.0		22.5			✓
435.0		24.			✓
PRE AMP - ON RF - MAX					

TEST	SYSTEM NUMBER	DATE
A	9	7-30-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
430.0		18.9			✓
435.0		20.			✓

		TEST		SYSTEM NUMBER		DATE	
		B2		9		7-30-85	

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
430.0		19			✓
435.0		21			✓

	TEST	SYSTEM NUMBER	DATE
	D-10	9	8-5-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (cw)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
435.0		19.0		11.5	✓

	TEST	SYSTEM NUMBER	DATE
	F 38 + 39	*9*	*8-9-85*

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
435.0		*22*		*12*	*✓*

TEST	SYSTEM NUMBER	DATE
PRE TEST	*9*	*7-25-85*

RECEIVER *ICOM 471A*

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
432.0		*-102* ✳	
✳ *102 c/B TRANSFER ON MAXIMUM*	*ATTENUATION OSCILLATOR OUTPUT.*	*MODEL 540B*	*-HP*

	TEST	SYSTEM NUMBER	DATE
	A	9	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
432.0		-117	

7-30-85

	TEST	SYSTEM NUMBER	DATE
	B2	9	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM) Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
432.0		-130	

	TEST	SYSTEM NUMBER	DATE
	D-10	9	8-5-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
435.0		-120	

	TEST	SYSTEM NUMBER	DATE
	F 38 + 39	9	8-9-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for 3-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
435.0		-132	
USING HP MODEL 540B	TRANSFER SET AT 215 MHZ	OSCILLATOR	

TEST	SYSTEM NUMBER	DATE
PRE TEST	*10*	*7-25-85*

TRANSMITTER *KENWOOD TS 430S/PS 430/MC 80/AT 250/SP 430*

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		*94*			✓
3.8		*104*			✓
7.3		*105*			✓
10.3		*105*			✓
14.3		*106*			✓
18.3	—	—	—	—	—
21.3		*99*			✓
24.8	—	—	—	—	—
28.3		*95*			✓

	TEST	SYSTEM NUMBER	DATE
	A	10	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		95			✓
3.8		106			✓
7.3		109			✓
10.3		108			✓
14.3		110			✓
18.3		–			
21.3		107			✓
24.8		–			
28.3		94			✓

TEST	SYSTEM NUMBER	DATE
BL	*10*	*7-29-85*

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		*96*			✓
3.8		*106*			✓
7.3		*110*			✓
10.3		*109*			✓
14.3		*111*			✓
18.3		*—*			
21.3		*109*			✓
24.8		*—*			
28.3		*96*			✓

	TEST	SYSTEM NUMBER	DATE
	D-5	*10*	*8-7-85*

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		*94.5*		*94*	*✓*
3.8		*104*		*104*	*✓*
7.3		*105*		*105*	*✓*
10.3		*105*		*104*	*✓*
14.3		*105*		*105*	*✓*
18.3		*—*			
21.3		*99*		*99*	*✓*
24.8		*—*			
28.3		*91*		*90*	*✓*

TEST	SYSTEM NUMBER	DATE
F5+6	10	8-8-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8	84		84		✓
3.8	90		88		✓
7.3	96		97		✓
10.3	96		96		✓
14.3	95		95		✓
18.3	–		–		
21.3	87		85		✓
24.8	–		–		
28.3	77		80		✓

ANTENNA TUNER WORKS FINE –

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	*10*	*7-25-85*

RECEIVER *KENWOOD TS 430S/PS-430/MC 80/AT 250/SP 430*

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-6 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-86.2	
3.8		-86.2	
7.3		-84.2	
10.3		-87.3	
14.3		-87.3	
18.3		-86.5	
21.3		-86.6	
24.8		-83.0	
28.3		-83.0	

TEST	SYSTEM NUMBER	DATE
A	10	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-83.1	
3.8		-85.0	
7.3		-82.6	
10.3		-85.7	
14.3		-86	
18.3		-84.8	
21.3		-85.4	
24.8		-81.2	
28.3		-82.5	
		WITH ANTENNA TUNER ON LINE (AUTOMATIC)	

TEST	SYSTEM NUMBER	DATE
BL	10	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-87.5	
3.8		-88.4	
7.3		-86	
10.3		-89	
14.3		-88.2	
18.3		-87.3	
21.3		-87.6	
24.8		-84.9	
28.3		-85.7	

	TEST	SYSTEM NUMBER	DATE
	D 5	10	8-8-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-81.4	
3.8		-84.7	
7.3		-79.2	
10.3		-83.8	
14.3		-84.2	
18.3		-81.6	
21.3		-83.6	
24.8		-79.1	
28.3		-77.8	

TEST	SYSTEM NUMBER	DATE
F 5+6	10	8-8-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM) Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8	-84.1		
3.8	-86.5		
7.3	-81.9		
10.3	-87.0		
14.3	-86.3		
18.3	-84.2		
21.3	-83.4		
24.8	-81.2		
28.3	-84.8		
	WITH ANTENNA TUNER -		

TEST	SYSTEM NUMBER	DATE
PRE TEST	11	7-25-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		97			✓
3.8		108			✓
7.3		110			✓
10.3		110			✓
14.3		110			✓
18.3		—			—
21.3		107			✓
24.8		—			—
28.88		100			✓

50 Ω DUMMY LOAD
CW - WIDE BAND

	TEST	SYSTEM NUMBER	DATE
	A	11	7-30-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		97			✓
3.8		108			✓
7.3		111			✓
10.3		111			✓
14.3		112			✓
18.3	—	—	—	—	—
21.3		108			✓
24.8	—	—	—	—	—
28.9		96			✓

	TEST	SYSTEM NUMBER	DATE
	B2	*11*	*7-30-85*

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		*98*			✓
3.8		*109*			✓
7.3		*111*			✓
10.3		*111*			✓
14.3		*112*			✓
18.3		—			-
21.3		*110*			✓
24.8		—			-
28.~~3~~ *8*		*98*			✓

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		97			✓
3.8		108			✓
7.3		110			✓
10.3		111			✓
14.3		110			✓
18.3					
21.3		107			✓
24.8					
28.8		97			✓

TEST	SYSTEM NUMBER	DATE
E6	11	8-8-85

TRANSMITTER

| FREQUENCY (MHZ) | POWER OUT (WATTS) (CW) | | | | USB VOICE MODULATIO |
| | WITHOUT DEVICE | | WITH DEVICE | | |
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		95		90	✓
3.8		105		106	✓
7.3		109		109	✓
10.3		108		107	✓
14.3		109		108	✓
18.3		–			-
21.3		106		105	✓
24.8		–			-
28.8		99		90	✓

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8				96	✓
3.8				106	✓
7.3				108	✓
10.3				107	✓
14.3				109	✓
18.3				—	
21.3				105	✓
24.8				—	
28.8				93	✓

TEST	SYSTEM NUMBER	DATE
D 18, E 9, 10, 11	*11*	*8-8-85*

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		*97*			✓
3.8		*107*			✓
7.3		*110*			✓
10.3		*109*			✓
14.3		*110*			✓
18.3		—			
21.3		*106*			✓
24.8					
28.3		*99*			✓

TEST	SYSTEM NUMBER	DATE
F7	11	8-8-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		98		98	✓
3.8		109		108	✓
7.3		110		110	✓
10.3		109		108	✓
14.3		108		108	✓
18.3					
21.3		107		107	✓
24.8					
28.8		99		100	✓

TEST	SYSTEM NUMBER	DATE
PRE TEST	11	7-25-85

RECEIVER KENWOOD TS430S / PS430 / MC 80

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-6 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-88.2	
3.8		-89.1	
7.3		-86.4	
10.3		-89.5	
14.3		-89.6	
18.3		-89.2	
21.3		-88	
24.8		-84.7	
28.3		-86.7	

TEST	SYSTEM NUMBER	DATE
A	11	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-88	
3.8		-88.2	
7.3		-85.5	
10.3		-89.1	
14.3		-89.2	
18.3		-88.3	
21.3		-87.8	
24.8		-83.7	
28.3		-86.2	

TEST	SYSTEM NUMBER	DATE
B 2	11	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM) Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-83.3	
3.8		-85	
7.3		-81.1	
10.3		-83.8	
14.3		-83.7	
18.3		-83.7	
21.3		-81.8	
24.8		-81.4	
28.3		-81.5	

TEST	SYSTEM NUMBER	DATE
D-17 + E-5	11	8-7-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-84	
3.8		-85.6	
7.3		-82	
10.3		-84.3	
14.3		-84.3	
18.3		-85	
21.3		-82	
24.8		-79.2	
28.3 28.8		-83	

TEST	SYSTEM NUMBER	DATE
E 6	11	8-8-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		-84	
3.8		-85.5	
7.3		-81.8	
10.3		-85	
14.3		-84.8	
18.3		-85.2	
21.3		-83.9	
24.8		-79.1	
28.3		-84	

TEST	SYSTEM NUMBER	DATE
E 7+8	*11*	*8-8-85*

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM) Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		*-83.7*	
3.8		*-85.8*	
7.3		*-81.4*	
10.3		*-85.4*	
14.3		*-85.4*	
18.3		*-86.1*	
21.3		*-83.9*	
24.8		*-78.3*	
28.3		*-82*	

TEST	SYSTEM NUMBER	DATE
D 18, E 9, 10 + 11	11	8-8-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		- 84	
3.8		- 85	
7.3		- 81	
10.3		- 84	
14.3		- 84	
18.3		- 84.8	
21.3		- 82.2	
24.8		- 78	
28.3		- 83.3	

	TEST	SYSTEM NUMBER	DATE
	F7	11	8-8-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8	-85		
3.8	-86.5		
7.3	-81.5		
10.3	-86		
14.3	-86		
18.3	-86.8		
21.3	-86.2		
24.8	-79		
28.3	-81.4		

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	*12*	*1-25-85*

TRANSMITTER *KENWOOD TR 7930*

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.0 (25W)		*23.5*			✓
144.0 (5W)		*5.7*			✓
12 VOLT DC POWER –					

TEST	SYSTEM NUMBER	DATE
A	12	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.0 (25W)		23.1			✓
144.0 (5W)		5.6			✓

	TEST	SYSTEM NUMBER	DATE
	B	12	7-31-85

TRANSMITTER

FREQUENCY (MHZ)		POWER OUT (WATTS) (CW)				USB VOICE MODULATION
		WITHOUT DEVICE		WITH DEVICE		
		W/AT	W/O/AT	W/AT	W/O/AT	
144.0	HI		24.5			✓
144.0	LO		5.8			✓

TEST	SYSTEM NUMBER	DATE
D12	12	8-5-85

TRANSMITTER

FREQUENCY (MHZ)		POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
		WITHOUT DEVICE		WITH DEVICE		
		W/AT	W/O/AT	W/AT	W/O/AT	
144.0	HI		23		22	✓
144.0	LO				6	✓

	TEST	SYSTEM NUMBER	DATE
	F 32, 33	*12*	*8-9-85*

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.5 H1		*26*		*27*	*✓*

F 32, 33   *12*   *8-9-85*

TEST	SYSTEM NUMBER	DATE
PRE TEST	12	7-25-85

RECEIVER *KENWOOD TR -7930*

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0		-106.5	
BOONTON FM 1 KHZ TONE	SIGNAL GEN -	-202 H	

TEST	SYSTEM NUMBER	DATE
A	12	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0		-110	

TEST	SYSTEM NUMBER	DATE
B	12	7-31-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0		- 90	

12   7-31-85

	TEST	SYSTEM NUMBER	DATE
	D12	12	8-5-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0	-105.0	-107.0	

8-5-85

	TEST	SYSTEM NUMBER	DATE
	F 32+33	12	8-9-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.0	-107		

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	*13*	*7-26-85*

TRANSMITTER *KENWOOD TR 2600 HANDHELD*

FREQUENCY (MHZ)	POWER OUT (WATTS) (C-W) FM				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
145.0 *HI*		*4.0*			✓
145.0 *LO*		*0.5*			✓

	TEST	SYSTEM NUMBER	DATE
	A	13	7-29-84

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) ~~(CW)~~ FM				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
145.0 HI		4.0			✓
145.0 LO		0.4			✓

TEST	SYSTEM NUMBER	DATE
D13	13	8-5-85

TRANSMITTER

FREQUENCY (MHZ)		POWER OUT (WATTS) ~~CW~~ FM				USB VOICE MODULATION
		WITHOUT DEVICE		WITH DEVICE		
		W/AT	W/O/AT	W/AT	W/O/AT	
145.0	HI		4.0		4.0	✓
145.0	LO		0.5		0.5	✓

8-5-85

	TEST	SYSTEM NUMBER	DATE
F 19, 21, 25, 29		13	8-9-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) ~~(CW)~~ FM				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
144.5 HI		4			✓
144.5 LO		0.4			✓

| | TEST | SYSTEM NUMBER | DATE |
| | PRE TEST | 13 | 7-26-85 |

RECEIVER *KENWOOD*   TR 2600   HAND HELD

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
145.0		-97.2	
BOONTON FM SIGNAL LEVEL	SIG. GEN - ADJUSTED	202H TO 5 ON	S/METER

	TEST	SYSTEM NUMBER	DATE
	A	13	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
145.0		94.0	

	TEST	SYSTEM NUMBER	DATE
	D 13	13	8-5-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
145.0	- 96	- 96	

TEST	SYSTEM NUMBER	DATE
F19, 21, 25, 29	13	8-9-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
144.5		-97	

	TEST	SYSTEM NUMBER	DATE
	PRE TEST	14	7-26-85

TRANSMITTER *DRAKE*

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8		—			
3.8		90			✓
7.3		87			✓
10.3		-			
14.3		90			✓
18.3		—			
21.3		75			✓
24.3					
28.3					

TEST	SYSTEM NUMBER	DATE
A	14	7-29-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8					
3.8		65			✓
7.3		75			✓
1).3					
14.3		120			✓
18.3					
21.3		105			✓
24.8					
28.3					

TEST	SYSTEM NUMBER	DATE
B	14	7-31-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8					
3.8		107			✓
7.3		125			✓
10.3					
14.3		99			✓
18.3					
21.3		90			✓
24.8					
28.3					

TEST	SYSTEM NUMBER	DATE
D	14	8-5-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8					
3.8		71		71	✓
7.3		72		105	✓
10.3					
14.3		90		62	✓
18.3					
21.3		48		50	✓
24.8					
28.3					

TEST	SYSTEM NUMBER	DATE
F 16 + 17	*14*	*8-9-85*

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIC
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
1.8					
3.8		*35*		*38*	✓
7.3		*40*		*35*	✓
10.3					
14.3		*50*		*40*	✓
18.3					
21.3		*80*		*75*	✓
24.8					
28.3					

TEST	SYSTEM NUMBER	DATE
PRE TEST	14	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM) Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8			
3.8		-55	
7.3		-55.8	
10.3		-	
14.3		-56	
18.3		-	
21.3		-52.2	
24.8		-	
28.75		-54.3	

TEST	SYSTEM NUMBER	DATE
A	14	7-29-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		—	
3.8		-91.2	
7.3		-91.3	
10.3		—	
14.3		-81.9	
18.3		—	
21.3		-82.1	
24.8		—	
28.5		-82.1	
		dB INCREASE TO OPERATOR	DUE IMPROVEMENT

A

TEST	SYSTEM NUMBER	DATE
B	14	7-31-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for 3-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8		—	
3.8		-88	
7.3		-89.7	
10.3		—	
14.3		-87.4	
18.3		—	
21.3		-80	
24.8		—	
28.3		-82	

AGC SET ON S FOR SSB

TEST	SYSTEM NUMBER	DATE
D	14	8-5-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8	—		
3.8	84.1		
7.3	83.1		
10.3	—		
14.3	81.9		
18	—		
21.3	77.3		
24.8	—		
28.3	—		

TEST	SYSTEM NUMBER	DATE
F 16 + 17	14	8-9-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
1.8	—	—	
3.8	84.8	-84.8	
7.3	85.0	-84.1	
10.3	—	—	
14.3	81.5	79.5	
18.3	—	—	
21.3	75.0	73.3	
24.8	—		
28.3			

	TEST	SYSTEM NUMBER	DATE
	PRETEST	*16*	*7-26-85*

TRANSMITTER *SWAN*

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
52.∅		*75*			✓
SET UP PAGE 8 *BIRD MODULE 250H*					

7-26-85

	TEST	SYSTEM NUMBER	DATE
	A	16	7-30-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATIO
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
52.0		*105			✓

* INCREASE DUE TO BETTER LOADING -

| | | TEST | SYSTEM NUMBER | DATE |
| | | B | 16 | 7-31-85 |

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
52.0		85.0			✓

TEST	SYSTEM NUMBER	DATE
D7	16	8-5-85

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
52.0		93		91	✓

	TEST	SYSTEM NUMBER	DATE
	F 14+15	*16*	*8-9-85*

TRANSMITTER

FREQUENCY (MHZ)	POWER OUT (WATTS) (CW)				USB VOICE MODULATION
	WITHOUT DEVICE		WITH DEVICE		
	W/AT	W/O/AT	W/AT	W/O/AT	
52.0		*88*		*88*	✓

TEST	SYSTEM NUMBER	DATE
PRE TEST	16	7-26-85

RECEIVER SWAN 250

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
52.0		-85	
RF GAIN MAX		-120 STRONG AUDIBLE SIGNAL	
AUDIO GAIN	-FULL UP		
RF GAIN	11OO O'CLOCK POSITION.		
TUNE FOR	AN AUDIBLE SIGNAL		
H P 608 D	SIG GEN		

TEST	SYSTEM NUMBER	DATE
A	16	7-30-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
52.0		-120	

	TEST	SYSTEM NUMBER	DATE
	B	*16*	*7-31-85*

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
52.0		*-120*	
STRONG	*AUDIBLE*	*SIGNAL*	

TEST	SYSTEM NUMBER	DATE
D	16	8-5-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM)		
	Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
52.0	-120	-120	

STRONG AUDIBLE SIGNAL

TEST	SYSTEM NUMBER	DATE
F14415	16	8-9-85

RECEIVER

FREQUENCY (MHZ)	SIGNAL LEVEL (dBM) Signal Generator Level for S-5 on USB		
	WITH DEVICE	WITHOUT DEVICE	
52.1	-120	-120	

F14415   16   8-9-85